SCVJ
Volume 5, Issue 1, 2024
DOI: http://doi.org/10.55989/DIBB9277

Science View Journal
ISSN (Online): 2734-2638

Effects of *Gongronema Latifolium* Leaves Extract as Source of Vitamins and Minerals on Growth and Haematology of Broilers

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Abstract:
The present study was conducted to determine the effects of Gongronema latifolium leaves extract (GLLE) as a supplementary source of vitamins and minerals on growth performance and haematology of broiler finishers. A total of 20 four (4) weeks old broilers were randomly selected and assigned to five treatment groups, namely water (control), water+ vitalyte, water+ 60ml GLLE, water+ 30ml GLLE and water+ 10mIGLLE. Results showed that there were significant (P<0.05) differences in weight gain but there were no significant differences (P>0.05) in Hb, PCV and RBC. The relative weights of gizzard, heart and liver of the broilers fed extract (except 30ml extract) were significantly (P<0.05) reduced compared with the broilers fed vitalyte. The group fed 30ml extract had the highest weight in gizzard. 30ml GLLE enhanced the growth performance of broilers without any adverse effect on their blood. GLLE can serve as a substitute to the commercially synthetic vitamins and minerals premixes in feeding poultry.

Keywords: Gongronema latifolium, growth, haematology, vitamins, minerals.

I. Introduction

Poultry production has been described as the most economic means of reducing the animal protein short fall in developing countries (Smith, 2001, Oluyemi and Roberts, 2007. Osakwe et al., 2017). Gongronema latifolium commonly called "Utazi" and "arokeke" in South Eastern and South Western Nigeria respectively, is one of the plants whose extracts (stem, leaves and root) have been found to be beneficial to both humans and animals (Machebe et al., 2011). It is abundantly available in virgin forests in many parts of sub-Sahara Africa and some parts of China (Nielsen, 1965). It is used as a leafy vegetable and spice in southeastern Nigeria (Agbo et al., 2009). Agbo et al., (2005) identified the crop to be nutritionally high in iron, zinc, vitamin, protein and amino acids and thus could complement the inadequacies of these substances in feed.

Achieving maximum health and performance of poultry requires nutritionally balanced diets. One of the common problems with regard to backyard flocks relates to poor or inadequate feeding programmes that can lead to vitamin and mineral deficiencies in broilers. Also there is high cost of commercially produced vitamins hence increasing the cost of poultry production. This study was aimed at determining the effect of inclusion of Gongronema latifolium leaf extract (GLLE), as a supplementary source of vitamins and minerals, on the growth performance and haematology of broiler finishers.

II. Materials and Methods

PLANT COLLECTION

Fresh leaves of Gongronema latifolium (Utazi) were plucked from a farm in Abazu Ogwa town in Mbaitoli LGA, Imo State, Nigeria.

EXTRACTION OF THE LEAVES

One hundred and fifty grams(150g) of the milled leaves was soaked in 5 Litres of water for 24hrs. It was subsequently filtered and the filtrate collected was stored in a refrigerator to improve the storage quality and prevent change of test. Vitalyte (a commercial source of vitamins) was administered in water according to the manufacturer's recommendation of 5g per litre of drinking water. This protocol was repeated weekly in order to ensure the availability of fresh samples of the extract.

ANIMAL HANDLING AND SAMPLE COLLECTION

A total number of twenty, four (4) weeks old broiler birds were bought from relief market in Owerri, Imo State, Nigeria. The broiler birds were acclimatized for five (5) days and assigned to five (5) treatment groups. The birds were housed in a clean plastic cage under standard condition and temperature. The broilers were fed well and good hygiene was maintained by regular cleaning and removal of faeces. The treatments shown below were given orally to the broiler birds for four (4) weeks.

At the end of this treatment blood samples were carefully collected from the animals using puncture method. The blood samples were taken to the laboratory for haematological analysis. The birds were sacrificed and their organs (gizzard, heart and liver) collected and weighed.

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TABLE 1: TREATMENT OF BROILER FINISHERS

Group	No of Birds	Treatment
A	4	Water only
B	4	Water+vitalyte
C	4	Water + 60ml GLLE
D	4	Water + 30ml GLLE
E	4	Water + 10ml GLLE

ESTIMATION OF HAEMATOLOGICAL INDICES

Haemoglobin estimation was done by the cyanomethemoglobin method described in Chineyere et al, (2018). 20 microlitre of blood was added to 5ml of drabkins solution in a test tube and mixed thoroughly. This was incubated at room temperature for 5 minutes. Absorbance was read 540nm against a reagent blank. (Drabkin's solution). The sample haemoglobin concentration was read off using spectrophometer.

Determination of packed cell volume was done using capillary tubes with blood and micro haematocrit centrifuge and reader as described by Mitruka and Rawnsely, 1977. The capillary tube was filled with the mixed 60% of blood; one end of the capillary tube was sealed with plastin and then placed in micro haematocrit centrifuge and spun at 11, 000rpm for 5mins. The spun tube was read using haematocrit reader.

The bulk dilution method was used to determine the red blood cell (RBC) using the improved Neubaur counting chamber. The dilution method was used to determine the total white blood Cell (WBC) using the improved neubaur counting chamber as described by Lamb (1991).

STATISTICAL ANALYSIS

Haematological and organ indices from the five (5) groups were compared using their mean and standard deviation (SD) calculated by the Microsoft office excel. The student T-Test was used in testing the level of significance and P-value greater than 0.05($P>0.05$) was considered not significantly different. Analysis of variance (ANOVA) was carried out with SPSS.

III. RESULT AND DISCUSSION

Values on the same column with different superscripts are significantly different ($p<0.05$) from each other. Result is given as n ± SD.

- n is the mean of four (4) samples.
- SD is standard deviation.

TABLE 2: GROWTH WEIGHT INDICES OF BROILER FINISHERS FED GLLE

Group	Treatment	Initial Weight (kg)	Final Weight (kg)
A	Water	0.70±0.00^{a}	1.93±0.059^{a}
B	Water + vitalyte	0.90±0.00^{c}	2.10±0.00^{c}
C	Water + 60ml GLLE	0.80±0.00^{b}	1.95±1.06^{ab}
D	Water + 30ml GLLE	0.80±0.00^{b}	2.10±0.00^{c}
E	Water + 10ml GLLE	0.80±0.00	2.00±0.00^{b}

The initial weights of the group given GLLE were significantly lower than the group given vitalyte. At the end of treatment, the group given vitalyte had a final weight 2.10±0.00. Also the group given 30ml GLLE had a final weight of 2.10+_0.00. For the group fed vitalyte, the weight gain was from 0.90±0.00 to 2.10±0.00 whereas the group given 30ml GLLE, the weight gain was from 0.80±0.00 to 2.10±10.00. This suggests that the GLLE extract increased the weight of the broilers better than the vitalyte. The result shows that GLLE significantly ($P<0.05$) increased the growth weight. Final body weight were higher for birds on vitalyte and GLLE (30ml and 10ml), indicating that finisher broilers can tolerate up to 30ml and 10ml concentration of GLLE respectively with positive effects on their growth performance. The level of GLLE used in this study had nutritional benefits to the birds probably because it contained active vitamins and minerals which are beneficial to the growth of the birds.

TABLE 3: HAEMATOLOGICAL INDICES OF BROILER FINISHERS FED GLLE

Group	Treatment	Hb (g/dl)	PCV (%)	RBC (X10^{6}/c)	TWBC (X10^{6}/c)
A	Water	9.45±4.92^{a}	28.50±15.55^{a}	4.78±0.35^{a}	5.35±0.95^{ab}
B	Water + vitalyte	12.08±0.88^{a}	33.00±7.12^{a}	4.98±1.04^{a}	5.53±1.27^{ab}
C	Water + 60ml GLLE	13.48±1.68^{a}	41.00±7.12^{a}	4.90±0.65^{a}	4.28±1.09^{a}
D	Water + 30ml GLLE	13.48±3.16^{a}	40.50±9.40^{a}	5.53±1.01^{a}	4.05±0.49^{a}
E	Water + 10ml GLLE	13.48±3.16^{a}	40.50±.40^{a}	4.88±0.57^{a}	6.40±2.11^{b}

Values are given as n±SD. n is the mean of 4 samples and SD is the standard deviation. Values on the same column with different superscripts are significantly different ($p<0.05$) from each other.

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There was no significant difference (P>0.05) in hb, PCV and RBC of the groups fed GLLE and the group fed vitalyte. Hence, extract and vitalyte had the same effect on PCV and RBC. This suggests that the GLLE had no adverse effect on the haematology of the birds.

TABLE 4: ORGAN INDICES OF BROILER FINISHERS FED GLLE

Group	Treatment	Gizzard (g)	Heart (g)	Liver (g)
A	Water	21.47±3.13^{a}	5.06±0.09^{a}	38.09±0.86^{a}
B	Water + vitalyte	41.40±5.35^{c}	4.81±0.19^{b}	23.91±0.94^{b}
C	Water + 60ml GLLE	31.28±2.98^{b}	3.05±0.04^{b}	21.61±1.1^{c}
D	Water + 30ml GLLE	42.00±1.78^{c}	3.62±9.40^{c}	21.38±0.89^{c}
E	Water + 10ml GLLE	34.86±4.19^{b}	3.16±0.05^{d}	20.55±0.70^{c}

Values are given as n±SD. n is the mean of 4 samples and SD is the standard deviation. Values on the same column with different superscripts are significantly different (p<0.05) from each other.

There was no significant difference (p>0.05) in the gizzard weight of the broilers fed vitalyte and those fed 30ml GLLE. Although there was reduction in the heart weight of the broilers fed GLLE when compared with those fed vitalyte, it is observed that the broilers fed 30mIGLLE had higher heart weight (3.62+0.20) than those fed 60mlGLLE and10ml GLLE. This suggests 30ml GLLE may be the best volume of the extract to serve as supplementary source of vitamin and minerals.

IV. Conclusion

This study has shown the positive effect of Gongronema latifolium leaves extract in poultry production. The result presented revealed that up to 10ml and 30ml of Gongronha latifolium leaves extract can be included in broiler starter diet to enhance growth performance and haematology status without adverse effect. The Gongronema latifolium leave extract can conveniently replace the use of some conventional source of vitamins and mineral supplements in rural communities where these premixes are not readily available and affordable due to cost.

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